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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,233	08/20/2003	Satoshi Masumi	5405-5	6472

7590 12/08/2006

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EXAMINER

MRUK, GEOFFREY S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 12/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/644,233	MASUMI, SATOSHI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6,8 and 15-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,8 and 15-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3, 4, 6, 8, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (US 6,534,128 B1) in view of Feinn et al. (US 6,193,345 B1).

With respect to claim 1, Carlson discloses an ink jet printer (Column 1, line 20) comprising:

- a recording head (Column 22, line 26) on which a plurality of nozzles for jetting an active energy ray curable ink (Column 21, line 53 – Column 22, line 25) are arranged;
- a feeding member for feeding a recording medium (Column 22, line 25); and
- an active energy ray radiating member (Column 22, line 29-34, i.e. RPC UV Processor) which radiates an active energy ray;
- wherein an image is recorded by jetting the ink from the nozzles of the recording head to the recording medium fed by the feeding member and by radiating the active energy ray by the active energy ray radiating member to the ink which sticks to the recording medium (Column 15, lines 50-67);

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- wherein a viscosity of the ink is not less than 20 mPa's and not more than 200 mPa's at 25 °C (Column 4, lines 38-60), and the viscosity of the ink is not less than 8 mPa's and not more than 30 mPa's when the ink is jetted from a nozzle (Column 4, lines 56-60) of the inkjet printer, and the ink substantially includes no volatile component (Column 10, lines 23-40; Column 22, lines 30-32 i.e. UV ink; Claim 1 i.e. solvent free); and
- wherein the active energy ray radiating member radiates the active energy ray so as to have each dot diameter formed on the recording medium to be from 50 to 200  $\mu\text{m}$  (Column 22, lines 34-36).

With respect to claim 4, Carlson discloses a head temperature adjusting mechanism arranged in the neighborhood of the jetting opening, for adjusting a temperature of the ink at the jetting opening to not less than 30°C (Column 4, lines 54-67, i.e. desired print head temperature).

With respect to claims 6 and 15, Carlson discloses the ink includes an active energy ray curable compound (Column 21, line 53 – Column 22, line 25).

With respect to claim 8, Carlson discloses forming an image by jetting ink to a recording medium with the ink jet printer (Column 1, lines 16-25).

However, Carlson fails to disclose:

- a jetting opening of each nozzle, from which the ink is jetted, has a diameter of not less than 12  $\mu\text{m}$  and not more than 22  $\mu\text{m}$ ;
- wherein a volume of a drop of the ink jetted from each nozzle is not less than 1 pico-liter and not more than 6 pico-liter, and

- a supply opening side of each nozzle, to which the ink is supplied, differs from a jetting opening side of each nozzle in an angle of an inner circumferential surface of the nozzle with respect to a center line of the nozzle.

Feinn discloses an apparatus (Column 1, lines 42-48) for generating high frequency ink ejection and ink chamber refill where

- a jetting opening of each nozzle (Fig. 3, element 82), from which the ink is jetted, has a diameter of not less than 12  $\mu\text{m}$  and not more than 22  $\mu\text{m}$  (Table III, Orifice Diameter I);
- wherein a volume of a drop of the ink jetted from each nozzle is not less than 1 pico-liter and not more than 6 pico-liter (Table III, Drop Volume), and
- a supply opening side (Fig. 8, element H) of each nozzle (Fig. 8, element 82), to which the ink is supplied, differs from a jetting opening side (Fig. 8, element I) of each nozzle in an angle of an inner circumferential surface of the nozzle with respect to a center line of the nozzle.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the apparatus disclosed by Feinn for printing the illustrative examples disclosed by Carlson. The motivation for doing so would have been "(1) individual drops remain nearly constant in volume for bursts of one to eight drops at high frequencies (this, allows smooth gray level ramps, which is a fundamental requirement in high quality imaging" (Column 11, lines 4-8).

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2. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (US 6,534,128 B1) in view of Feinn et al. (US 6,193,345 B1).

With respect to claim 1, Carlson discloses an ink jet printer (Column 1, line 20) comprising:

- a recording head (Column 22, line 26) on which a plurality of nozzles for jetting an active energy ray curable ink (Column 21 line 53 – Column 22, line 25) are arranged;
- a feeding member (Column 22, line 25) for feeding a recording medium; and
- an active energy ray radiating member (Column 22, line 29-34, i.e. RPC UV Processor) which radiates an active energy ray;
- wherein an image is recorded by jetting the ink from the nozzles of the recording head to the recording medium fed by the feeding member and by radiating the active energy ray by the active energy ray radiating member to the ink which sticks to the recording medium (Column 15, lines 50-67);
- wherein a viscosity of the ink is not less than 20 mPa's and not more than 200 mPa's at 25 °C (Column 4, lines 38-60), and the viscosity of the ink is not less than 8 mPa's and not more than 30 mPa's (Column 4, lines 56-60) when the ink is jetted from a nozzle of the ink jet printer, and the ink substantially includes no volatile component (Column 10, lines 23-40; Column 22, lines 30-32 i.e. UV ink; Claim 1 i.e. solvent free); and
- wherein the active energy ray radiating member comprises a first radiation source and a second radiation source (Column 22, lines 32-33 i.e. two mercury

bulbs) and radiates the active energy ray so as to have each dot diameter formed on the recording medium to be from 50 to 200  $\mu\text{m}$  (Column 22, lines 34-36).

With respect to claim 17, Carlson discloses exposure wavelengths or exposure illumination intensities (Column 22, line 34) are different between the first radiation source (Column 22, line 34, i.e. 200  $\text{mJ}/\text{cm}^2$ ) and the second radiation source (Column 22, line 34, i.e. 240  $\text{mJ}/\text{cm}^2$ ).

With respect to claim 18, Carlson discloses a first radiation energy of the first radiation source (Column 22, line 34, i.e. 200  $\text{mJ}/\text{cm}^2$ ) is smaller than a second radiation energy of the second radiation source (Column 22, line 34, i.e. 240  $\text{mJ}/\text{cm}^2$ ).

With respect to claim 19, Carlson discloses the first radiation energy (Column 22, line 34, i.e. 200  $\text{mJ}/\text{cm}^2$ ) is made from 1 to 20% of a total radiation energy (Column 15, lines 59-64).

However, Carlson fails to disclose:

- a jetting opening of each nozzle, from which the ink is jetted, has a diameter of not less than 12  $\mu\text{m}$  and not more than 22  $\mu\text{m}$ ;
- wherein a volume of a drop of the ink jetted from each nozzle is not less than 1 pico-liter and not more than 6 pico-liter.

Feinn discloses an apparatus (Column 1, lines 42-48) for generating high frequency ink ejection and ink chamber refill where

- a jetting opening of each nozzle (Fig. 3, element 82), from which the ink is jetted, has a diameter of not less than 12  $\mu\text{m}$  and not more than 22  $\mu\text{m}$  (Table III, Orifice Diameter I);

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- wherein a volume of a drop of the ink jetted from each nozzle is not less than 1 pico-liter and not more than 6 pico-liter (Table III, Drop Volume).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the apparatus disclosed by Feinn for printing the illustrative examples disclosed by Carlson. The motivation for doing so would have been "(1) individual drops remain nearly constant in volume for bursts of one to eight drops at high frequencies (this, allows smooth gray level ramps, which is a fundamental requirement in high quality imaging)" (Column 11, lines 4-8).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 3, 4, 6, 8, and 15-19 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.


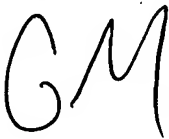
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GSM  
12/4/2006

  
12/6/06  
MANISH S. SHAH  
PRIMARY EXAMINER